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FALL Newsletter 2011

ENHANCING WILDLIFE HABITAT THROUGH PARTNERSHIPS AND PERSEVERANCE

Commitment is Key to Rocky Mountain Elk Foundation Conservation Efforts

by Celestine Duncan, Editor

The Rocky Mountain Elk Foundation (RMEF) is celebrating 27 years of protecting and enhancing habitat to ensure the future of elk and other wildlife. Since the organization was founded in 1984 more than 5.9 million acres of critical habitat have been protected and more than 626,000 acres opened or secured for public access for hunting and other outdoor recreation.

"Healthy habitat is essential for elk and other wildlife," explains Tom Toman, wildlife biologist and director of conservation for the RMEF. "One of our missions is to support research and management efforts to restore and protect habitat. We believe that noxious weed invasions are one of the greatest threats to elk, other wildlife, and ranching."

The RMEF has been a strong partner and financial supporter of weed management projects as part of their habitat stewardship program. "We provided a grant to our first cooperative weed control project in 1989, just five years after the RMEF was founded," says Toman. "Since that time we've funded 536 projects in 24 states and invested more than $4.3 million to control noxious weeds. Our grant dollars are allocated on a cost-share basis, so they've leveraged more than $20.8 million from public and private partners to control weeds on 375,000 acres in prime elk habitat. If you figure that every acre directly treated protects at least two more, our efforts have likely impacted over one million acres of wildland." Although the bulk of cooperative weed control efforts supported by the RMEF are located in the western states of Montana, Oregon, Washington, Wyoming, Idaho and Colorado, projects range as far east as Pennsylvania and as far

["RMEF" continued on page 2]

IN THIS ISSUE

["RMEF" continued from page 1]

south as New Mexico and Arkansas.

"One of the only blessings of weeds is that we see a lot more collaborative efforts than we've ever seen before," says Toman. "That's the only way it can really work – to have all the landowners participating and pulling together." To foster cooperation among partners, the RMEF requires at least a 50 percent match in their grants to weed management projects. "Partner dollars are important because it confirms the agency or private landowner commitment to the project and we also get a lot more acres treated," explains Toman. Funding requests for invasive plant control projects are closely reviewed to be certain the work will directly benefit elk and other wildlife, and that there is a public benefit to the project. This is easily met if the area provides an important seasonal range for elk such as winter range or calving area, and elk are available for viewing and/or hunting on the property or on adjacent public lands. Weed management tools used on projects include herbicide treatments, manual and mechanical control, biological control agents, reseeding and restoration projects, prescribed burns in combination with noxious weed treatments, and public education and outreach.

ASOTIN COUNTY, WASHINGTON

Nelle Murray, Asotin County Weed Coordinator based in Asotin, Washington echos Toman's enthusiasm for the RMEF noxious weed management grants. "Grants from the RMEF are an important catalyst for bringing our cooperative weed projects together to control Mediterranean sage (*Salvia aethiopis* L.), sulfur cinquefoil (*Potentilla recta*), whitetop (*Cardaria* spp.) and other new weed invaders," explained Murray. "Our county-based funding is only $69,000 a year, which has to cover the coordinator salary, office, vehicles and other expenses. If we don't have grant money it isn't possible to implement our on-ground projects. These grants are instrumental in supporting our aggressive and proactive weed management effort."

The early detection rapid response program in Asotin County is funded entirely through grant dollars provided by the RMEF, Asotin County Conservation District (federal cost-share programs), Washington State Department of Agriculture, Washington Fish and Wildlife, and other partners. "It's our most valuable pot of money that we can use instantly throughout the county," says Murray. "If we find a new infestation of a priority noxious weed we can use these funds to control the problem while it's still manageable." Tom Toman agrees, "By identifying weeds early and moving swiftly before they spread, we can keep an area relatively weed free."

Washington State Fish and Wildlife backpack spray crews commit three days each year to treating the smaller, outlying weed infestations missed during aerial application in Asotin County.

The RMEF and Washington Department of Agriculture joined forces to fund a cooperative project between Washington Fish and Wildlife and Asotin County Noxious Weed Control Board to control Mediterranean sage, a Class A* noxious weed in Washington. A 300-acre infestation was treated in 2007 with an aerial application of Tordon® 22K at 1 quart per acre (qt/A) with a follow-up aerial treatment in 2010. "We use backpack and horseback ground crews to control the weed in spray shadows from the aerial application and to treat satellite patches outside the main infestation," explains Murray.

"We believe that noxious weed invasions are one of the greatest threats to elk, other wildlife, and ranching"

Another project involves a containment program on sulfur cinquefoil located in the southwestern portion of the county. "We are treating any new infestations with Milestone® at 5 fluid ounces per acre (fl oz/A) or Tordon 22K at 1 pint per acre (pt/A) and getting excellent control," says Murray. "Our goal for sulfur cinquefoil shifted from eradication to containing the plant to one corner of the county and reducing its impact

* Class A noxious weeds are new invaders with limited distribution in Washington that pose a serious threat to the environment. Prevention of seed production is mandated statewide with the goal of eradication.

on native vegetation."

The spirit of cooperation in Asotin County is evident in support for weed control efforts from private landowners, Weed Board members, agency personnel, and other partners such as RMEF. Murray explains, "My job and that of the Weed Board is to make sure that everyone is communicating so we don't duplicate efforts or waste money. Our private and federal partners share a common goal for healthy rangelands that can be passed on to future generations. The Weed Board helps them do that by forming positive cooperative relationships."

LINCOLN COUNTY, WYOMING

Another prime example of pulling together is the Greys River noxious weed control project located in southwestern Wyoming about 60 miles south of Jackson Hole. The project encompasses more than 65,000 acres of critical wildlife habitat on United States Forest Service (USFS) lands. "This area provides important summer, winter and transitional range for just over 2,000 elk," explains Don DeLong, Program Manager for Wildlife, Range, and Weeds for the Greys River Ranger District. The area also provides important habitat for other large mammals including mule deer, moose, bighorn sheep, black bear, and an occasional mountain goat, grizzly bear, and gray wolf.

In 2006 the USFS teamed up with the RMEF and Lincoln County Weed and Pest District in Afton, Wyoming to control newly invading infestations of leafy spurge (*Euphorbia esula*), spotted knapweed (*Centaurea stoebe*), and yellow toadflax (*Linaria vulgaris*) in backcountry areas within the Greys River Ranger District. "Leafy spurge currently infests nearly 50 acres on the district, spotted knapweed about 200 acres, and yellow toadflax about 40 acres, with most patches less than a quarter of an acre in size," says DeLong. "The district is at a critical juncture…weed infestations are currently small enough for a targeted program to contain them and to prevent widespread distribution, but the stage is set for rapid increases in the acreage and distribution of these noxious weeds. Funds from RMEF and other partners including Wyoming Wildlife and Natural Resources Trust, National Fish and Wildlife Foundation, Wyoming Sportsmen for Fish and Wildlife, and the Upper Snake River Sage Grouse Working Group are being well spent to prevent a possible future situation in which 10 times the funding would not be sufficient."

Farrel Hoopes, weed control specialist for the Lincoln County Weed and Pest District explained the control effort. "We have an integrated program including releases of *Aphthona* beetles for leafy spurge control; however, the last two cold winters and wet springs seem to have reduced the beetle population. Since most of the infestations are relatively small, we use selective herbicides to control and hopefully eradicate newly established weed infestations."

Horseback sprayer Royce Hoopes has controlled weeds within backcountry portions of the project area for more than five years. He uses horseback spray equipment manufactured by High Country Sprayers. The spray tanks, which mount on a pack mule or horse, are coupled with a battery-operated pump to pressurize the system. "This equipment was designed for mountainous terrain and works well for packing into the backcountry," explains Royce. "We pack 20 gallons of spray solution (10 gallons per tank) and can treat about an acre of weeds before refilling. We use Tordon 22K since this herbicide controls most of our target weeds. It's really exciting to go back to sites that were infested with leafy spurge and see grass and little to no spurge. I think we are making a big difference by treating weeds before they have a chance to spread in the backcountry."

Royce Hoopes uses horse-pack sprayer equipment to treat leafy spurge in the backcountry of Greys River Ranger District in Wyoming.

PUBLIC AWARENESS AND EDUCATION

The RMEF recognizes the importance of public awareness and education in protecting lands from noxious weed invasion. The July/August 2011 issue of RMEF's publication *Bugle* magazine featured the story, "Battling the Bad Seeds" <www.tinyurl.com/badseeds>, which

["RMEF" continued on page 4]

["RMEF" continued from page 3]

covers weed identification, biology, impacts, and guidelines on what individuals can do to help stop the spread of weeds. Projects receiving grants from the RMEF often include educational components as part of their integrated weed management effort. The Asotin County Noxious Weed Control Board public outreach program that includes "Weeds on Parade" is one of those projects. Murray explains, "The annual Asotin County fair parade where we publicize our invasive plant management program grew from six volunteers in 2004 to 34 supporters this year. Participants included Weed Board members, youth dressed as weeds, and employees with the Washington Fish and Wildlife and the USFS. It's great fun and we pass out lots of information on weeds, candy to the kids, and generally just have a good time. It's a perfect example of how important it is to spread the word about invasive plants and what we can accomplish through positive partnerships."

The RMEF is committed to maintaining their mission to "put money on the ground" to protect and restore healthy habitat. "We recognize that noxious weeds will always be with us, but if we work together we can turn the tide against these invaders," says Toman, "Elk and other wildlife depend on us to protect and enhance habitat for future generations."

Tom Toman can be contacted at **Tom@RMEF.org** for additional information on the RMEF noxious weed grant program.

"Weeds on Parade" helps to spread the word about invasive plants and partnerships in Asotin County. Educational efforts such as this are often included in projects receiving grants from RMEF.

WHERE IT ALL BEGAN

In 1984, four hunters from Troy, Montana—a pastor, a realtor, a logger and a drive-in owner—pooled their talents and resources and created the Rocky Mountain Elk Foundation. Their vision was an organization that would directly benefit elk, other wildlife and their habitat by putting money to work "on the ground." Since its founding, the RMEF has expanded from 2,500 members in late 1984 to become an international non-profit wildlife organization with over 178,000 members whose support has protected and enhanced millions of acres of North American wildlife habitat. The RMEF boasts more than 10,000 volunteers working through 550 chapters across the United States. What began as a "crazy" idea has become a shining star in the world of conservation and hunting. The foundation has received 27 major national and state awards for their leadership in conservation efforts including resource stewardship, habitat acquisitions, and conservation education efforts.

EDITOR'S NOTE

We would like to extend our unending gratitude to the Rocky Mountain Elk Foundation for their vision and years of commitment to invasive plant management projects. Without their support many cooperative weed control projects and partnerships would not have been possible.

Establishing Desirable Grasses in Russian Knapweed Infested Sites

by Celestine Duncan, Editor

Russian knapweed (*Acroptilon repens*) is a creeping perennial that spreads through seed and vegetative root buds. Once established, infestations expand primarily by adventitious roots.

Russian knapweed is common throughout the western United States, infesting about 1.2 million acres of rangeland, cropland, pastures, and disturbed sites. The weed is poisonous to horses but is usually avoided by grazing animals. Dense monocultures of Russian knapweed reduce desirable vegetation through a combination of competition and allelopathy.

"The extensive root system makes long term control of the weed more difficult," explained Joe Vassios, a graduate student at Colorado State University. "In addition, there is speculation that allelopathic residues in surface plant material or root exudates can impact successful establishment of desirable grass following Russian knapweed removal."

Vassios, in cooperation with Dr. Scott Nissen, Dr. George Beck, and Jim Sebastian from Colorado State University, initiated a study in 2008 on reseeding Russian knapweed infested sites. The purpose of the study was to examine the effects of tillage and herbicide applications on Russian knapweed control and grass establishment. Specific objectives of the study were to 1) evaluate Russian knapweed control with various herbicides, 2) evaluate the impact of herbicide treatments on grass establishment, and 3) determine the effect of tillage on Russian knapweed control and grass establishment.

Russian knapweed in bloom.

Methods

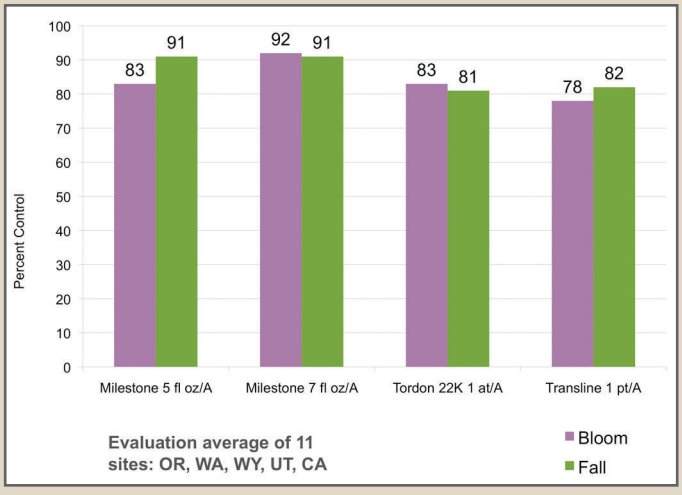
"We selected a large, uniform population of Russian knapweed for our study site. The site was previously farmed, but was recently converted to open space by Commerce City, Colorado," explained Vassios. The site was located in central Colorado about 15 miles east of Denver. Individual plot size was about 20 by 70 feet arranged as a split-split plot design with four replications of each treatment.

["RUSSIAN KNAPWEED" continued on page 6]

Timing Russian Knapweed Control with Milestone Herbicide

Russian knapweed control with Milestone has been extensively studied in field trials throughout the western United States. Results of these trials show that Milestone at 5 to 7 fluid ounces per acre (fl oz/A) provides excellent Russian knapweed control when applied from late bud to after foliage has died back in fall. Milestone is taken up by the foliage, root crown, and by roots from the soil. The following graph shows percent Russian knapweed control with Milestone, Tordon 22K, and Transline applied at two application timings summarized over 11 different locations (Figure A). Additional information on Russian knapweed control with herbicides is summarized in TechLine Newletter 2005-2006 (http://www.techlinenews.com/TLWinter2005-2006.pdf).

Figure A. Russian knapweed control one year after treatment with Milestone® applied at bud growth stage and in fall.



["RUSSIAN KNAPWEED" continued from page 5]

The study included three tillage treatments for seedbed preparation: no tillage, minimum tillage (coulter wheel), and full seedbed preparation (till and pack) as main plot treatments. Russian knapweed control treatments included a non-treated control, hand-weeded control, Tordon® 22K at 1.5 quarts of product per acre (qt/A), and Milestone® at 7 fluid ounces of product per acre (fl oz/A). Two grass species were selected as restoration species: slender wheatgrass (*Elymus trachycaulus*) and western wheatgrass (*Pascopyrum smithii*).

The site was mowed to remove above ground vegetative growth in late October 2008 and tillage treatments were applied three days after mowing. Herbicides were applied in November 2008 in 20 gallons total solution per acre. Grass species were seeded in March 2009, about four months following herbicide application.

Visual injury ratings for rosettes and bolting plants were taken in July 2009 and 2010, 9 and 21 months after treatment, respectively. Above ground production (biomass) was collected for grass species and Russian knapweed in October 2009. Hand-weeded controls were maintained periodically during summer 2009.

Results

Results of the study showed Milestone and Tordon 22K provided greater than 99% Russian knapweed control 9 and 21 months after treatment (MAT) (**Figure 1**). In contrast, the hand-weeded control only showed 85 and 66% control at 9 and 21 MAT, respectively.

In plots receiving physical or herbicide control treatments, seedbed preparation had no impact on Russian knapweed shoot density or biomass (**Figure 2**, **Figure 3**). However, in non-treated plots both minimum- and full-tillage treatments significantly reduced Russian knapweed biomass compared to non-tilled (**Figure 3**).

Milestone and Tordon 22K provided greater than 99% Russian knapweed control 9 and 21 months after treatment. Pictured above, herbicide treated plots (right) compared to non-treated (left).

Herbicide treatments did not have a negative impact on seeded grasses. In fact, Milestone resulted in significantly greater grass biomass than either Tordon 22K or the hand-weeded control. Pictured above, seeded grasses nine months after herbicide treatment.

Herbicide treatments did not have a negative impact on seeded grasses. Western and slender wheatgrass biomass was lowest in non-treated and hand-weeded controls, and greatest in herbicide treatments (**Figure 4**). Milestone resulted in significantly greater grass biomass than either Tordon 22K or the hand-weeded control. Removing above-ground Russian knapweed by hand resulted in grass production that was not significantly different from control plots.

Vassios says, "Results showing significantly less grass production in hand-weeded plots (Russian knapweed roots in tact) provide strong evidence that Russian knapweed allelopathy is a function of belowground interactions and is not a function of leachates from surface residues. We hope to conduct additional studies in the lab and field to examine possible allelopathy from intact Russian knapweed roots."

Figure 1. Visual percent control of Russian knapweed plants (9 and 21 MAT) for various control methods compared to non-treated control.

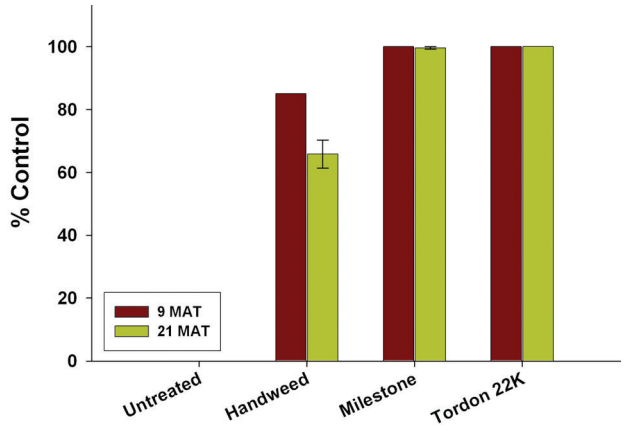


Figure 2. Number of Russian knapweed shoots per square meter for various control methods compared to non-treated control. There was no significant difference between tillage treatments for Russian knapweed stand counts (shoots/m^2).

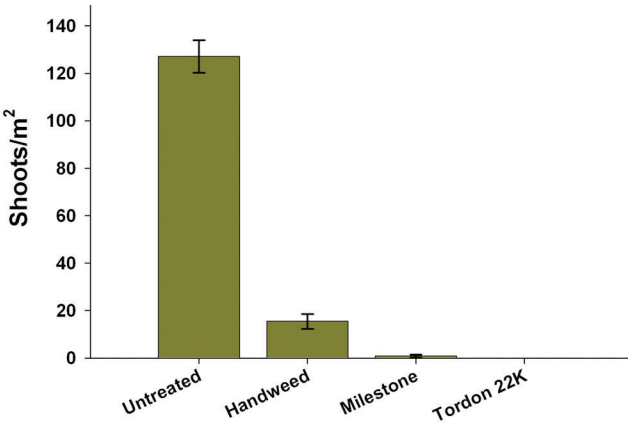


Figure 3. Russian knapweed biomass 12 months following treatment with various tillage and control methods. Data are shown in grams of fresh weight per square meter (g/m^2).

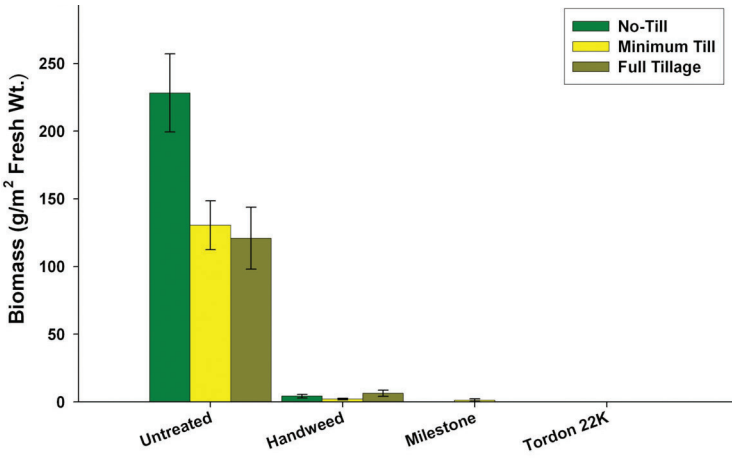
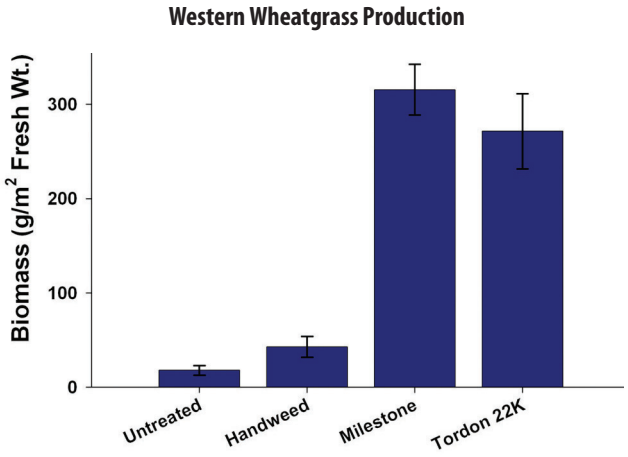
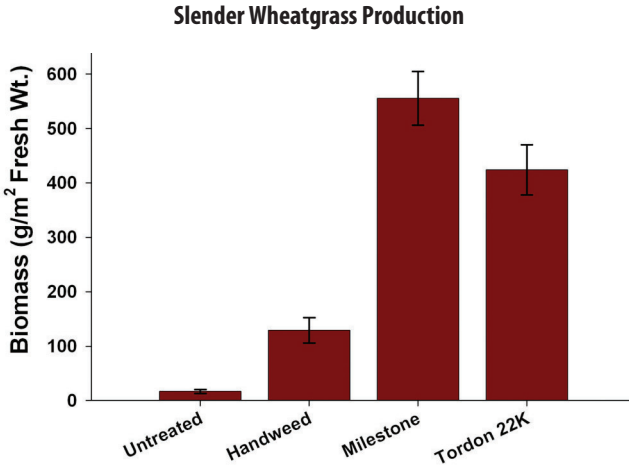


Figure 4. Western (top) and slender (bottom) wheatgrass production 12 months following treatment with various control methods.





EDITOR'S NOTE

Information in this article was presented in part at the Western Society of Weed Science Meeting in Hawaii in 2010 by Joseph D. Vassios, Scott J. Nissen, James R. Sebastian, and K. George Beck, Colorado State University, Ft. Collins, CO.

Native Grass Establishment Following Herbicide Applications

Photo courtesy of Mary Halstvedt

Herbicides are an important tool for removing noxious or invasive weeds from plant communities, allowing desirable vegetation to respond. However, severely degraded sites where desirable plants are either not present, or remnant populations of desirable grasses are insufficient to recover after invasive plant control may require re-vegetation.

It is important for land managers to have information on the length of time required between applying herbicide treatments and seeding desirable grasses to reduce the potential for seedling injury. The current label for aminopyralid-containing products (e.g., Milestone®) allows for use on established desirable grasses, or the herbicide can be applied in spring followed by fall grass seeding. The potential to seed grasses in late autumn as a dormant fall planting following an autumn herbicide application would allow more flexibility for land managers tasked with re-vegetating degraded sites.

Materials and Methods

Field research trials were established in 2009 to determine if warm and cool season grasses could be planted either in late autumn as a dormant fall planting or in the spring after a September application of herbicide. With a dormant seeding, grasses are planted in the fall just before the soil freezes. The seed remains dormant in the soil until the following spring when they will germinate and grow as soon as conditions are favorable.

Three sites were selected for the study at university research farms with Dr. Roger Becker, University of Minnesota, Dr. Rodney Lym, North Dakota State University, and Dr. Mike Moechnig, South Dakota State University. The study sites were tilled in August to prepare a seed bed and subsequently treated with glyphosate at 32 fluid ounces per acre (fl oz/A) to keep the sites weed free prior to seeding. Herbicide treatments included Milestone at 3, 7, and 14 fluid ounces per acre

Table 1: Herbicide application timing and seeding dates for cool and warm season grasses at three study locations.

Study location	Herbicide Application Date, 2009	Seeding Date	
		Dormant Fall 2009	Spring 2010
North Dakota	Sep. 15	-	Apr. 22
Minnesota	Sep. 16	Nov. 17	-
South Dakota	Sep. 22	Nov. 9	Apr. 4

Table 2: Grasses seeded at three university research farms located in Minnesota (MN), South Dakota (SD) and North Dakota (ND).

Grass	Bayer Code	Type	MN	SD	ND
Big bluestem	ANOGE	Warm	X	X	X
Little bluestem	ANSOC	Warm	X	X	
Sideoats grama	BOBCU	Warm	X	X	X
Switchgrass	PANVI	Warm	X	X	X
Yellow indiangrass	SOSNU	Warm	X	X	X
Canada wildrye	ELYCA	Cool	X	X	
Green needlegrass	STVDI	Cool	X	X	X
Intermediate wheatgrass	AGRIT	Cool		X	X

(fl oz/A), Transline® at 1.5 pints per acre (pt/A), and Tordon® 22K at 1 quart per acre (qt/A). Herbicides were applied in September (Table 1) with a CO_2 backpack or bicycle sprayer at 13 to 20 gallons per acre prior to seeding. Cool and warm season grasses commonly planted in restoration projects were selected for seeding. Grasses were seeded in late autumn or spring (**Table 1**) with a six-row cone seeder with 7 to 12 inch row spacing. Cool season species included intermediate wheatgrass (*Agropyron intermedium*), Canada wildrye (*Elymus canadensis*), and green needlegrass (*Stipa viridula*). Warm season species included big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), sideoats grama (*Bouteloua curtipendula*), switchgrass (*Panicum virgatum*), and indiangrass (*Sorghastrum nutans*) (**Table 2**). Experiments were designed as randomized complete blocks with four replications per treatment combination.

Non-treated control plots were hand weeded for the early part of the growing season in 2010 to help ensure seedling success. Visual plant injury, plant count (number of plants per 0.5 meter row), and percent frequency of occurrence were measured in July 2010 at all sites.

Results and Discussion

Results showed grass establishment was greatest with the spring grass planting date compared to dormant fall planting when averaged across treatments (including the non-treated control) and sites (**Figure 1**). There was no significant difference in grass establishment in herbicide treated plots compared to the non-treated control when seeded at the dormant fall planting date (**Figure 2**). The low success in seedling establishment in the dormant fall planting may have been due to unfavorable conditions during winter and early spring.

Figure 1. The NUMBER OF GRASS SEEDLINGS established across all treatments (including non-treated control) and grass species was significantly less in the dormant fall planting (2.5 seedlings/0.5 meter row) compared to spring planting (5 seedlings/0.5 meter row). Data are for all locations combined (P=0.05).

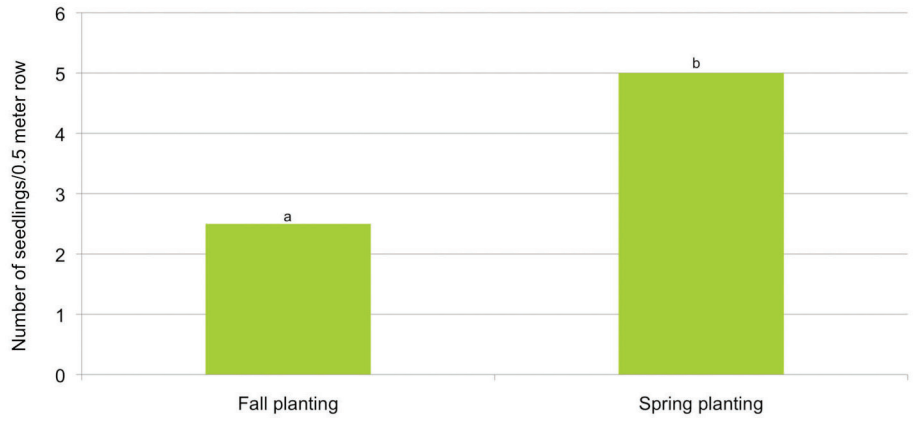


Figure 2. There was no significant difference in the NUMBER OF COOL AND WARM SEASON GRASS SEEDLINGS established per 0.5 meter row with a September application of Milestone at 7 fl oz/A followed by a dormant fall (November) planting. Data were collected the growing season following planting and are averaged across locations. See Table 2 for key to Bayer Codes.

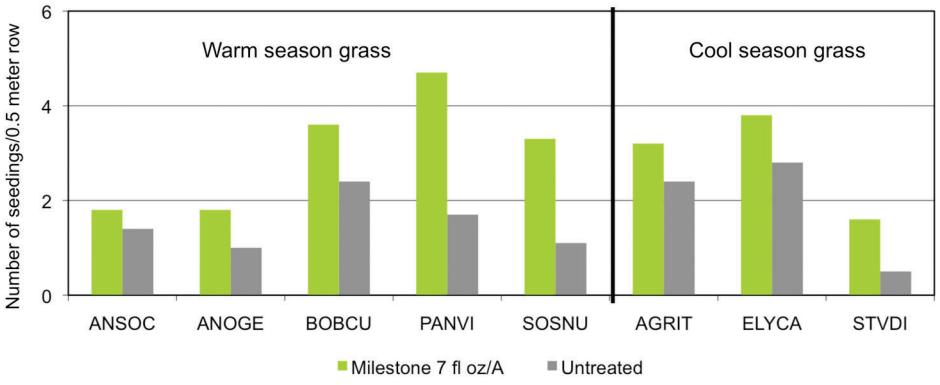
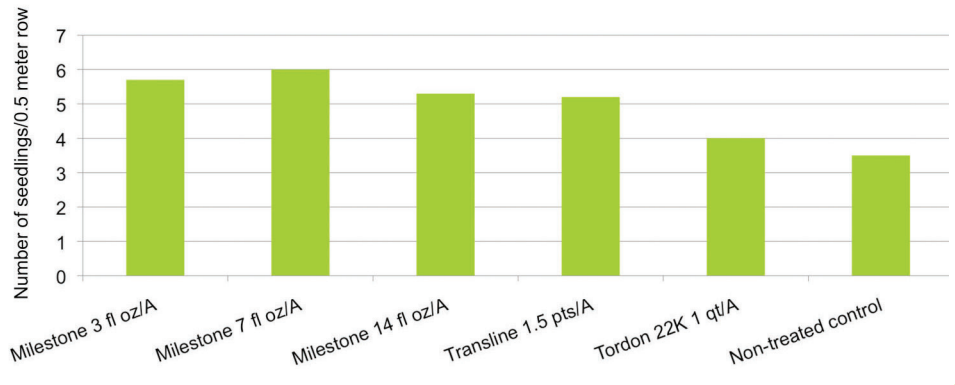


Figure 3. There was no significant difference in the NUMBER OF GRASS SEEDLINGS established per 0.5 meter row between various herbicide treatments compared to the non-treated control for the spring planting. Data shown are for COOL AND WARM SEASON GRASSES COMBINED (excluding big bluestem) and averaged across locations.



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["NATIVE GRASS" continued from page 9]

Results of the spring planting date showed there was no significant difference in either cool or warm season grass establishment (except for big bluestem) in herbicide-treated plots compared to non-treated controls. There was a trend for greater seedling establishment in plots treated with Milestone at 3 and 7 fl oz/A compared to non-treated controls (**Figure 3**). The number of cool season grasses established in spring plantings ranged from 7.2 to 7.6 plants per 0.5 meter row (plants/0.5m row) in Milestone-treated plots, 6.6 plants/0.5m row in Transline-treated plots, and 5.2 or 5.4 plants/0.5m row for Tordon 22K-treated or non-treated controls, respectively. There was also a trend for the number of established warm season grass seedlings to be less in plots treated with Milestone at 14 fl oz/A, Transline, or Tordon 22K compared to Milestone at 3 or 7 fl oz/A; however, this difference was not significant. Milestone at 14 fl oz/A is twice the maximum broadcast rate of 7 fl oz/A. The percent frequency of warm season grass was greater in plots treated with Milestone at 3 or 7 fl oz/A or Transline at 1.5 pts/A compared to non-treated controls (**Figure 4**).

Big bluestem was the only grass that had a significant response to herbicide treatment (**Figure 5**). Seedling establishment was greatest in plots treated with Milestone at 3 and 7 fl oz/A compared to the non-treated control (**Figure 5**). Big bluestem seedling establishment was significantly greater with Milestone at 3 fl oz/A compared to Milestone at 14 fl ozA, Transline at 1.5 pts/A, or the non-treated control when averaged across locations.

Figure 4. The FREQUENCY OF WARM SEASON GRASSES was significantly greater in plots treated with Milestone at 3 or 7 fl oz/A or Transline at 1.5 pts/A compared to non-treated controls. Data averaged across locations. (P=0.05)

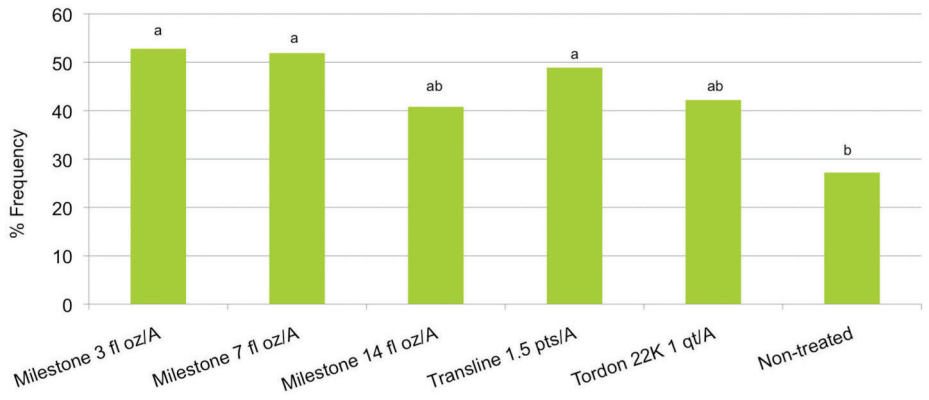
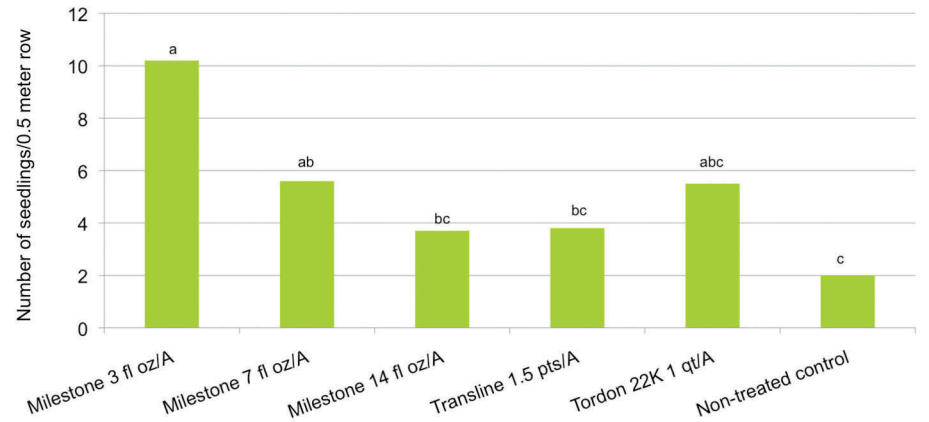


Figure 5. There was a significant difference in the NUMBER OF BIG BLUESTEM SEEDLINGS per 0.5 meter row between various treatments applied in September with an early spring planting. Data were collected the growing season following planting and averaged across locations (P< 0.05).



Conclusions

Based on these results a land manager could apply Milestone at 7 fl oz/A or less in early fall followed by a dormant fall planting or early spring planting of these grass species and have successful seedling establishment if environmental conditions are favorable. These data are corroborated by a similar study in Colorado (http://tinyurl.com/3ml52w4) in addition to other field experiments conducted in the western United States. Results confirm the utility of Milestone herbicide in rangeland grass reseeding programs following invasive broadleaf weed control.

EDITOR'S NOTE

Information in this article was presented at the Western Society of Weed Science meeting in Spokane, WA in 2011 by Mary B. Halstvedt[1], Vanelle F. Peterson[2], Roger L. Becker[3], Rodney G. Lym[4], and Michael J. Moechnig[5]

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FALL APPLICATION OF MILESTONE® HERBICIDE TO CONTROL KEY INVASIVE WEEDS

Fall is an excellent time to control invasive weeds with Milestone. Late summer and fall rains provide land managers with a good opportunity to extend their application season.

Russian Knapweed

Milestone at 5 or 7 fluid ounces per acre (fl oz/A) is highly effective for controlling Russian knapweed. Unlike other herbicides, applications of Milestone can be made on Russian knapweed through late summer and until after the foliage has died back (leaves are brown and dead!) in fall. Milestone is taken up by the foliage, through the root crown or from the soil into this noxious weed. Milestone® will provide residual control of plants that try to re-grow and emerge after the initial application.

Spotted and Diffuse Knapweed

The application window for treating spotted and diffuse knapweed with Milestone is wider than many other herbicide options. Milestone at 5 or 7 fl oz/A applied to spotted knapweed in fall gave excellent control (>95%) of both established plants and seedlings up to 2 years after treatment in Montana and was similar to the standard treatment of Tordon® 22K at 1 pint per acre (pt/A). Applications can be made up to late October or early November before soil freezes.

Canada Thistle

Field research has shown that fall applications are extremely effective with Milestone at labeled rates of 5 to 7 fl oz/A. Tank mixing with another herbicide is not necessary; Milestone alone will control Canada thistle. University of Nebraska research reports Canada thistle is actually more susceptible to herbicides when applied in the fall following a frost. Applications can be made in the fall as long as there is live Canada thistle foliage. Even though Canada thistle leaves will begin to senesce, generally there is still excellent efficacy up to late October as long as there is some green foliage.

Photos by Steve Dewey, Utah State University (retired)

Biennial Thistles

Fall application of Milestone® at 3 to 5 fl oz/A provides excellent control of biennial thistle (e.g. musk, bull, and plumeless thistle). Fall herbicide treatments may be applied to rosettes over a longer period in the fall than in the spring. An additional advantage is that fall treatments reduce the potential of injury from spray drift to foliage of nearby desirable plants since sensitive crops have been harvested or desirable plants are dormant.

Tamarisk (salt cedar) and Russian Olive

Fall is an excellent time to maintain grass understory and control re-sprouting on tamarisk and Russian olive with a tank-mix of Milestone herbicide with Garlon® 4 Ultra or Remedy® Ultra specialty herbicides. You should wait least 6 months after cutting to allow time for the plants to regrow and develop adequate leaf area for more herbicide uptake with a foliar application. Apply Milestone at 7 fluid ounces per acre plus Garlon® 4 Ultra or Remedy® Ultra at 3 quarts per acre (qt/A) with a non-ionic surfactant at 0.25% v/v or 1 qt/A of methylated seed oil (MSO). This treatment allows grasses to flourish and will also control broadleaf weeds such as Canada thistle, musk thistle, Russian knapweed, and many others that may invade the area after cutting. Tamarisk and Russian olive control may not be complete with just a single application so the site should be monitored in subsequent years and re-sprouts treated for complete control.

Other Species

Fall application of Milestone at 5 to 7 fl oz/A also provides excellent control of absinth wormwood, oxeye daisy, and several other invasive plants as indicated on the label.

View Milestone Herbicide label at **www.techlinenews.com**

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Some states require an individual be licensed if involved in the recommendation, handling or application of any pesticide. Consult your local extension office for information regarding licensing requirements. Milestone is not registered for sale or use in all states. Contact your state pesticide regulatory agency to determine if a product is registered for sale or use in your state.

Always read and follow label directions.

CORRECTION

In the article, "Weed Inventory Key to Measuring Program Success at Dinosaur National Monument" (Spring 2011), the peregrine falcon and bald eagle were referred to as "endangered." However, both species have been removed from ESA protection after meeting recovery goals. Thank you, Clint Wirick, for bringing this to our attention.

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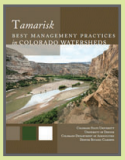

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Thanks for reading!

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